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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/517,705	03/02/2000	Chunlin Liang	042390.P5771D	4202

7590

12/18/2003

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EXAMINER

LOKE, STEVEN HO'YIN

ART UNIT	PAPER NUMBER
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2811

DATE MAILED: 12/18/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/517,705

Applicant(s)

LIANG ET AL.

Examiner

Steven Loke

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 November 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1, 16-18, 20 and 21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 16-18, 20 and 21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1 and 18 are rejected under 35 U.S.C. 102(e) as being clearly anticipated by Kuroi et al.

In regards to claim 1, Kuroi et al. show all the elements of the claimed invention in fig. 9. It is a circuit device comprising: a first transistor (NMOS) [42] including a first metal gate electrode (n-type titanium silicide film [41] which formed above layer [29]) over a first gate dielectric [4] on a first area [24] of a semiconductor substrate [1] and having a work function corresponding to the work function of the N-type silicon, wherein the first metal gate electrode is a metal alloy; and a second transistor (PMOS) [43] complementary to the first transistor including a second metal gate electrode (p-type titanium silicide film [41] which formed above layer [31]) over a second gate dielectric [4] on a second different area [25] of a semiconductor substrate [1] and having a work function corresponding to the work function of the P-type silicon; and wherein the first metal gate electrode and the second metal gate electrode are each separately disposed in respective ones of the first area [24] and the second area [25] of the semiconductor substrate and comprise the same type of metal (titanium).

In regards to claim 18, Kuroi et al. show all the elements of the claimed invention in fig. 9. It is a circuit device comprising: a first transistor (NMOS) [42] including a first gate electrode (n-type titanium silicide film [41] which formed above layer [29]) over a first gate dielectric [4] on a first area [24] of a semiconductor substrate [1] and having a Fermi level corresponding to the work function of the N-type silicon, wherein the first gate electrode is a metal alloy; and a second transistor (PMOS) [43] complementary to the first transistor including a second metal gate electrode (p-type titanium silicide film [41] which formed above layer [31]) over a second gate dielectric [4] on a second different area [25] of a semiconductor substrate [1] and having a Fermi level corresponding to a work function of the P-type silicon; and wherein the first metal gate electrode and the second metal gate electrode are each separately disposed in respective ones of the first area [24] and the second area [25] of the semiconductor substrate and comprise the same type of material (titanium).

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 16, 17, 20 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuroi et al.

In regards to claims 16, 20, Kuroi et al. differ from the claimed invention by not showing the first gate dielectric is silicon dioxide. It would have been obvious to one of

ordinary skill in the art to have silicon dioxide as the first gate dielectric because it is a conventional gate dielectric material.

In regards to claims 17, Kuroi et al. differ from the claimed invention by not showing the first metal gate electrode is one of tantalum, tantalum nitride, molybdenum silicide, and molybdenum nitride. It would have been obvious for the first metal gate electrode is one of tantalum, tantalum nitride, molybdenum silicide, and molybdenum nitride since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use. In re Leshin, 125 USPQ 416.

In regards to claim 21, Kuroi et al. differ from the claimed invention by not showing the first gate electrode is one of tantalum, tantalum nitride, molybdenum silicide, and molybdenum nitride. It would have been obvious for the first gate electrode is one of tantalum, tantalum nitride, molybdenum silicide, and molybdenum nitride since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use. In re Leshin, 125 USPQ 416.

5. Applicant's arguments filed 11/20/03 have been fully considered but they are not persuasive.

It is urged, in pages 4 and 5 of the remarks, that Kuroi cited by the Examiner fail to disclose a first gate electrode comprising one of a pure metal and a metal alloy.

However, Kuroi discloses the first gate electrode is a metal alloy which made of n-type titanium silicide (an alloy composed of a metal (titanium) and a nonmetal (N-type polycrystalline silicon) (col. 16, lines 40-48 of Kuroi et al. and the second definition of the word "alloy" in the Merriam-Webster OnLine Dictionary)). Therefore, Kuroi does

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disclose the first gate electrode comprising a metal alloy. Kuroi is still read on claims 1 and 18. Claims 16, 17, 20 and 21 are still obvious over of Kuroi because Kuroi does disclose a gate electrode comprising a metal alloy.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Steven Loke whose telephone number is (703) 308-4920. The examiner can normally be reached on 7:50 am to 5:20 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Lee can be reached on (703) 308-1690. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

sl
December 13, 2003

Steven Loke
Primary Examiner

